

UNITED STATES PATENT APPLICATION

FOR

METHOD AND APPARATUS FOR A UNIFIED COMMUNICATION MANAGEMENT VIA  
INSTANT MESSAGING

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**DESCRIPTION OF THE INVENTION****Related Applications**

[001] Applicants claim the right to priority under 35 U.S.C. § 119(e) based on Provisional Patent Application No. 60/272,122, entitled "VOICE MAIL INTEGRATION WITH INSTANT MESSENGER," filed February 27, 2001; Provisional Patent Application No. 60/272,167, entitled "DEVICE INDEPENDENT CALLER ID," filed February 27, 2001; Provisional Patent Application No. 60/275,667, entitled "CALENDAR CALLING AGENT," filed March 13, 2001; Provisional Patent Application No. 60/275,719, entitled "CALENDAR CALLING AGENT," filed March 13, 2001; Provisional Patent Application No. 60/275,020, entitled "METHOD AND APPARATUS FOR INTEGRATED BILLING VIA PDA," filed March 13, 2001; Provisional Patent Application No. 60/275,031, entitled "METHOD AND APPARATUS FOR UNIFIED COMMUNICATIONS MANAGER VIA INSTANT MESSAGING," filed March 13, 2001; and Provisional Patent Application No. 60/276,505, entitled "METHOD AND APPARATUS FOR CONTEXT BASED QUERYING," filed March 19, 2001, and all of which are expressly incorporated herein by reference in their entirety.

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[002] The present application also relates to U.S. Patent Application No. (\_\_\_\_\_), entitled "VOICE MAIL INTEGRATION WITH INSTANT MESSENGER," Attorney Docket No. 01-1001; U.S. Patent Application No. (\_\_\_\_\_), entitled "DEVICE INDEPENDENT CALLER ID," Attorney Docket No. 01-1002; U.S. Patent Application No. (\_\_\_\_\_), entitled "METHOD AND APPARATUS FOR CONTEXT BASED QUERYING," Attorney Docket No. 01-1005; U.S. Patent Application No. (\_\_\_\_\_), entitled "METHOD AND APPARATUS FOR CALENDARED

COMMUNICATIONS FLOW CONTROL," Attorney Docket No. 01-1007; U.S. Patent Application No. (\_\_\_\_\_), entitled "CALENDAR-BASED CALLING AGENTS," Attorney Docket No. 01-1008; U.S. Patent Application No. (\_\_\_\_\_), entitled "METHOD AND APPARATUS FOR INTEGRATED BILLING VIA PDA," Attorney Docket No. 01-1010; and U.S. Patent Application No. (\_\_\_\_\_), entitled "METHOD AND APPARATUS FOR DIAL STREAM ANALYSIS," Attorney Docket No. 01-1013, and all of which are expressly incorporated herein by reference in their entirety.

### Field of the Invention

[003] The present invention relates to managing communications and, more particularly, to methods and apparatus for a unified communication management via instant messaging.

### Background of the Invention

[004] A wide variety of means exist for communication between users. For example, a user may conduct phone calls via their home phone, work phone, and mobile phone. In addition, a user may also communicate via email and instant messaging.

[005] Unfortunately, managing such a wide variety of communication means can be difficult. In particular, as a user changes location communication with the user may vary. For example, the user, while on travel may only be reached by cell phone. However, the user may best be reached by email while at work. Also, the user may wish to implement various rules for receiving and controlling communications. For example, to be reached at home, the user may want the home phone to ring three times before forwarding the call to a cell phone. As another example, the user may wish to be

paged each time an email is received from a particular person while away from the office.

[006] Typically, to implement communication management, a person must individually manage each communication device separately. Thus, when the user wishes to change how communication is managed, the user may have to deal with numerous devices and, perhaps, service centers.

### **SUMMARY OF THE INVENTION**

[007] In accordance with an embodiment consistent with the principles of the present invention, a method is provided for managing communication devices utilizing at least one unified communication manager connected to a telephone network and a data network. The method performed by the at least one unified communication manager involves receiving an instant message from a user containing a request to configure at least one of the communication devices, configuring a connection for the one of the communication devices based on information in the instant message, and providing the user notification of the configuration of the connection for the one of the communication devices, the user notification being displayed on a display device for the user.

[008] In accordance with another embodiment consistent with the principles of the present invention, a computer readable medium capable of configuring a computer to perform a method of managing communication devices via a network comprising a telephone network, a data network, and at least one unified communication manager connected to both the telephone network and the data network is provided. The method performed by the unified communication manager involves receiving an instant

message from a user containing a request to configure at least one of the communication devices, configuring a connection for the one of the communication devices based on information in the instant message, and providing the user notification of the configuration of the connection for the one of the communication devices, the user notification being displayed on a display device for the user.

[009] In accordance with another embodiment consistent with the principles of the present invention, an apparatus for managing communication devices via a network comprising a telephone network, a data network, and at least one unified communication manager connected to both the telephone network and the data network is provided. The apparatus comprises means for receiving an instant message from a user containing a request to configure at least one of the communication devices, means for configuring a connection for the one of the communication devices based on information in the instant message, and means for providing the user notification of the configuration of the connection for the one of the communication devices, the user notification being displayed on a display device for the user.

[010] It is to be understood that both the foregoing general description and the following detailed description are exemplary and explanatory only and are not restrictive of the invention, as claimed.

#### **BRIEF DESCRIPTION OF THE DRAWINGS**

[011] The accompanying drawings, which are incorporated in and constitute a part of this specification, illustrate one embodiment of the invention and, together with the description, serve to explain the principles of the invention.

[012] Fig. 1 is a block diagram of a data processing and telecommunications environment, in accordance with methods and apparatus consistent with the principles of the present invention;

[013] Fig. 2 is a block diagram of a user terminal, in accordance with methods and apparatus consistent with the principles of the present invention;

[014] Figs. 3a-3m are exemplary screen shots in accordance with methods and apparatus consistent with the principles of the present invention;

[015] Fig. 4a is a block diagram of a service center, in accordance with methods and apparatus consistent with the principles of the present invention;

[016] Fig. 4b is a detailed block diagram of the unified communications server of Fig. 4a;

[017] Figs. 5a-5b are exemplary record tables used for controlling communications, in accordance with methods and apparatus consistent with the principles of the present invention;

[018] Fig. 6 is a block diagram of a voice network, in accordance with methods and apparatus consistent with the principles of the present invention; and

[019] Fig. 7 is a flow diagram illustrating a method of providing unified communication management via instant messaging, in accordance with methods and apparatus consistent with the principles of the present invention.

#### DETAILED DESCRIPTION

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[020] Methods and apparatus for unified communication management via instant messaging are provided. A unified communication manager receives from a data network one or more rules for responding to telephone calls. In particular, a user

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may interface the unified communication manager using an instant messaging service to manage various aspects of the user's communication such as phone calls, email, and instant messages. A user may also use the manager to manage contact information and profile information, such as rules for how communications are forwarded to the user. Thus, the user is provided with a unified communication manager to implement rules and conditions across a wide variety of devices and networks.

[021] Reference will now be made in detail to exemplary embodiments of the present invention, examples of which are illustrated in the accompanying drawings. Wherever possible, the same reference numbers will be used throughout the drawings to refer to the same or like parts.

[022] Fig. 1 is a block diagram of a data processing and telecommunications environment, in accordance with methods and apparatus consistent with the principles of the present invention. The data processing and telecommunications environment 100 may include a data network 102, a voice network 104, a service center 106, and a service center database 108. As shown, a user 110 may use a user terminal 112 to interface data network 102. In addition, user 110 may use phones 114, 116, and 118 to interface with voice network 104. For example, calling party 120 may use phone 122 to call user 110 at any one of phones 114, 116, and 118.

[023] Data network 102 provides communications between the various entities depicted in environment 100 of Fig. 1, such as user terminal 112 and service center 106. Data network 102 may be a shared, public, or private network and encompass a wide area or local area. For example, data network 102 may be implemented on a network, such as the Internet.

[024] Voice network 104 provides telephony services, for example, to allow calling party 120 to place a telephone call to user 110. For example, voice network 104 may be implemented using a network, such as the Public Switched Telephone Network ("PSTN"). Alternatively, voice network 104 may be implemented using voice-over Internet Protocol ("VoIP") technology. In addition, voice network 104 may be implemented using both the PSTN and VoIP technology consistent with the principles of the present invention. Voice network 104 is described in further detail with reference to Fig. 6.

[025] Service center 106 provides a platform for managing communications over data network 102 and voice network 104. In addition, service center 106 provides gateway functions, such as code and protocol conversions, to transfer communications between data network 102 and voice network 104. Service center 106 may be implemented using a combination of hardware and software. For example, service center 106 may be implemented using a plurality of a general purpose computers or servers coupled by a network (not shown). Although service center 106 is shown with direct connections to data network 102 and voice network 104, any number and type of network elements may be interposed between service center 106, data network 102, and voice network 104. Service center 106 is described in further detail with reference to Fig. 4.

[026] Service center database 108 contains information regarding user 110. For example, service center database 108 may contain information including, an identifier for user 110, a password, one or more email addresses for user 110, one or more instant messaging identifiers for user 110, and one or more telephone numbers, such as



for phones 114, 116, and 118. Service center database 308 may also indicate which server, e.g., unified communications server 460, should be notified when a communications event occurs. Additionally, service center database 108 may contain configuration information that indicate rules for how and when communications are forwarded, such as telephone calls over voice network 104. Service center database 108 may be implemented as an Oracle™ database using a combination of known hardware and software, such as Proliant™ servers and EMC storage devices.

[027] User terminal 112 provides user 110 an interface to data network 102. For example, user terminal 112 may be implemented using any device capable of accessing the Internet, such as a general purpose computer or personal computer equipped with a modem. User terminal 112 may also be implemented in other devices, such as the Blackberry™, and Ergo Audrey™. Furthermore, user terminal 112 may be implemented in wireless devices, such as pagers, mobile phones (with data access functions), and Personal Digital Assistants ("PDA") with network connections.

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[028] User terminal 112 also allows user 110 to communicate with service center 106. For example, user 110 may use instant messaging ("IM") to communicate with service center 106. IM is a communications service implemented over the Transmission Control Protocol and Internet Protocol ("TCP/IP") suite to create a private communication channel. Although there is no accepted universal IM standard, an appropriate IM model may be found in RFC 2778, M. Day et al., The Internet Society (2000), titled "A Model for Presence and Instant Messaging," which describes, *inter alia*, a model for providing instant messaging services. There are several known IM systems including America OnLine Instant Messenger ("AIM") and Microsoft Network Messenger

Service ("MSNMS"). In addition to IM services, user terminal 112 may use other aspects of TCP/IP including the hypertext transfer protocol ("HTTP"); the user datagram protocol ("UDP"); the file transfer protocol ("FTP"); the hypertext markup language ("HTML"); and the extensible markup language ("XML").

[029] User terminal 112 may communicate directly with service center 106. For example, a client application may be installed on user terminal 112, which directly communicates with service center 106. Alternatively, user terminal 112 may communicate with service center 106 via proxy 124. User terminal 112 is described in further detail with reference to Fig. 2.

[030] Proxy 124 provides an intermediate communications service for user terminal 112 and service center 106. Proxy 124 may act on behalf of user 110 to interface service center 106 and provides functions, such as authentication services, and protocol translation services. For example, user 110 may be a MSNMS subscriber and proxy 124 may be a MSNMS server. User 110 may then use MSNMS IM services to indirectly interface service center 106. As another example, proxy 124 may be a web site. User 110 may provide information, such as information for call forwarding patterns, to proxy 124 via web pages and secured using secured sockets layer ("SSL"). Proxy 124 may then establish an SSL session with service 106 and provide the information from user 110.

[031] Phones 114, 116, 118, and 122 interface voice network 104. Phones 114, 116, 118, and 122 may be implemented using known devices, including wireline phones and mobile phones, such as wireless phones. Although phones 114, 116, 118, and 122 are shown directly connected to voice network 104, any number of intervening

elements, such as a private branch exchange ("PBX"), may be interposed between phones 114, 116, 118, and 122 and voice network 104.

[032] Fig. 2 is a block diagram of a user terminal, in accordance with methods and apparatus consistent with the principles of the present invention. As shown, user terminal 112 includes a central processing unit (CPU) 200, a memory 202, a storage module 204, a network interface 206, an input interface 208, an output interface 210, an input device 216, and an output device 218.

[033] CPU 200 provides control and processing functions for user terminal 112. Although Fig. 2 illustrates a single CPU, user terminal 112 may include multiple CPUs. CPU 200 may also include, for example, one or more of the following: a co-processor, memory, registers, and other processing devices and systems as appropriate. For example, CPU 200 may be implemented using a Pentium™ processor provided from Intel Corporation.

[034] Memory 202 provides a primary memory for CPU 200, such as for program code. Memory 202 may be embodied with a variety of components of subsystems, including, a random access memory ("RAM"), and a read-only memory ("ROM"). For example, when user terminal 112 executes an application installed in storage module 204, CPU 200 may download at least a portion of the program code from storage module 204 into memory 308. As CPU 200 executes the program code, CPU 200 may also retrieve additional portions of program code from storage module 204.

[035] Storage module 204 provides mass storage for user terminal 112. Storage module 204 may be implemented with a variety of components or subsystems

including, for example, a hard drive, an optical drive, a general-purpose storage device, a removable storage device, and/or other devices capable of storing information. Further, although storage module 204 is shown within user terminal 112, storage module 204 may be implemented external to user terminal 112.

[036] Storage module 204 includes program code and information for user terminal 112 to communicate with service center 106. Storage module 204 includes program code for a calendar application 216, such as GroupWise provided by Novell Corporation, or Outlook provided by Microsoft Corporation; a client application 218, such as a MSNMS client, or AIM client; and an Operating System (OS) 216, such as the Windows Operation System provided by Microsoft Corporation. In addition, storage module 204 may include other program code and information (not shown), such as program code for TCP/IP communications; kernel and device drivers; configuration information, such as a Dynamic Host Configuration Protocol (DHCP) configuration; a web browser, such as Internet Explorer provided by Microsoft Corporation, or Netscape Navigator provided by Netscape Corporation; and any other software that may be installed on user terminal 112.

[037] Network interface 206 provides a communications interface between user terminal 112 and data network 102. Network interface 206 may receive and transmit communications for user terminal 112. For example, network interface 206 may be a modem, or a local area network ("LAN") port.

[038] Input interface 208 receives input from user 110 via input device 212 and provides the input to CPU 200. Input device 212 may include, for example, a keyboard,

a microphone, and a mouse. Other types of input devices may also be implemented consistent with the principles of the present invention.

[039] Output interface 210 provides information to user 110 via output device 214. Output device 214 may include, for example, a display, a printer, and a speaker. Other types of output devices may also be implemented consistent with the principles of the present invention.

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[040] Figs. 3a-3m illustrate exemplary screen shots of user interfaces to implement voice main integration with instant messenger. As shown in Fig. 3a, the screen shot provides a current location portion 300 for indicating that communications should be directed to the "AT HOME" location. Current location 300 may also indicate other locations, such as, for example, "AT WORK", "IN CAR", and "ON TRAVEL." Such locations can be based on predetermined choices or user configurable choices. The screen shot also provides a new message portion 302 that lists the number and type of new messages. In particular, new message portion 302 shows that there is "1 New EMAIL", "2 NEW VOICE MAILS", "2 NEW NOTIFICATIONS", and "3 NEW CALLS RECEIVED". New message portion 302 can also provide the last phone numbers dialed and the date they were dialed.

[041] The screen shot also provides a search portion 304 that allows a user to search for contact information regarding a particular person. For example, search portion 304 provides "FIRST NAME", "LAST NAME", "CITY", and "STATE" search inputs to find contact information of a particular person. The screen shot also provides a tools portion 306 that gives a user options to modify various aspects of the communications service. These options may include "REACH ME", "ACCOUNT

MANAGEMENT”, and “PROFILE” options. The “REACH ME” option allows a user to change where a user is to be contacted shown in the current location portion 300. The “ACCOUNT MANAGEMENT” option allows a user to modify information such as billing information associated with a called party. The “PROFILE” option allows a user to modify how communications are forwarded.

[042] As shown in Fig. 3b, the screen shot shows a user interface for a device manager. The screen shot shows a device manager portion 310 that allows a user to view and to change phone number settings. For example, the user can change at “WORK” and “AT HOME” phone number settings. Device manage portion 310 also provides a “CURRENT FEATURES” option that lists features being used. Such features include “CALL FORWARDING”, “\*69”, and “CALL WAITING”. The user also has the option to “ADD FEATURES” or “ADD NUMBERS”. The screen shot also provides a other devices portion 312 that allows a user to manage devices which are not associated with a particular location. Other devices portion 310 lists “CELL PHONE”, “PAGER”, and “HANDHELD” devices as other devices in which a user can manage. For each device, a user can view the number for the other device and associated “CURRENT FEATURES” for the other device. Other devices portion 310 also provides a “SYNCHRONIZE” option and “ADD DEVICE” option for the user.

[043] As shown in Fig. 3c, the screen shot shows a user interface for an address book. The screen shot shows an address list portion 315 that lists contact information for the user. For example, the contact information may include “NAME”, “ADDRESS”, “EMAIL”, and “INSTANT MESSENGER” information. The screen shot also shows a record information portion 317 that displays a specific record for a contact.

The user has the option to "UPDATE" the record. The screen shows also provides a search window to search for contact information and a calendar.

[044] As shown in Fig. 3d, the screen shot shows the user interface of Fig. 3c with a pull-down menu 320 that provides a number of options for a user to contact a selected person consistent with the present invention. For example, the user can contact the selected person using such options as "SEND PAGE", "CALL", "EMAIL", and "INSTANT MESSAGE". Pull-down menu 320 also provides a "REMOVE" and "UPDATE" option to modify contact information in the address book.

[045] As shown in Fig. 3e, the screen shot shows the user interface of Fig. 3c with a pop-up window 325 that provides a number of inputs to modify contact information for a person in the address book. Pop-up window 325 is shown to update a record for "TOM SERVINI" using, e.g., "NAME", "EMAIL", and "PHONE NUMBER" inputs. Pop-up window 325 may also provide a "COMMENTS" window for the user to input a comment.

[046] As shown in Fig. 3f, the screen shot shows a user interface for a message center panel having a summary portion 330 that lists messages received in a "RECEIVED:" column, the subject of the received messages in a "SUBJECT:" column, and the name of the persons who sent the messages in a "FROM:" column. Summary portion 330 may also provide other types of information such as the date/time the message was received, the data size of the message, or an attachment indicator. Additionally, summary portion 330 may provide a summary of recent e-mails or instant messages received by the user. Summary portion 330 also provides a number of options to process the messages. For example, the user may select a "PRINT

MESSAGE", "FORWARD", "REPLY", "REPLY ALL", or "NEW MESSAGE" option for the listed messages in summary portion 330. The screen shot also shows a detail view portion 332 that provides the details of a selected message. For example, the details of an email message from "KEVIN.TROTTIER" are shown. Detail view portion 322 also provides a "REPLY" option to reply to the viewed message.

[047] As shown in Fig. 3g, the screen shot shows a user interface for a message center panel having a summary portion 340, which is similar to summary portion 330 of Fig. 3f. Summary portion 340 provides summary information applicable to voice mails in a "NUMBER:", "FROM:" and "RECEIVED:" column. The screen shot also shows a detail portion 342 that allows a user to playback the voice message. Detail portion 342 also allows the user to "DELETE" or "SAVE" the voice message.

[048] Fig. 3h shows a screen shot of a message center panel having a message summary list portion 350 that lists a summary of messages received. The screen shot also shows a message detail portion 352 that displays detail of a message. Fig. 3i shows a screen shot of a user interface having a device summary portion 355 that lists the devices in use by the user and a device detail portion 357 that allows the user to configure a particular device. For example, the user may configure the number of times to ring the "HOME 1" or "CELL PHONE" device.

[049] Fig. 3j shows a screen shot of the user interface of Fig. 3i having a pop-up window 360 for adding a device. The screen shot also shows a detail portion 362, which is similar to detail portion 357 of Fig. 3i. Fig. 3k shows a screen shot of the user interface of Fig. 3i having a pop-window 370 that provides an "UPDATE RECORD" option for a user to modify the sequence of devices being called.



[050] Fig. 3l shows a screen shot of a user interface for account management having an overview portion 380 allow a user access to summary information regarding a user's account. For example, overview portion 380 a user to access "PREVIOUS BALANCE", "CURRENT CHARGES", "BASIC CHARGES", "LONG DISTANCE CHARGES", and "WIRELESS CHARGES" summary information. The screen shot also shows a message portion 382 displays messages regarding the user's account. For example, a message such as "Your bill is past due" can be displayed in message portion 382.

[051] Fig. 3m shows a screen shot of a user interface for profile management having a customer profile portion 390, which displays a customer's profile. The customer's profile may include information such as "Customer Name:", "Account Number:", "Address" and "Phone:" information. The screen shot also shows a personal profile portion 392 that displays a user's personal profile. The personal profile may include "Name:", "Address", etc. information. The screen shot also shows a business profile portion 394 that displays a business profile. The business profile may include information such as "Company", "Job Title:" etc. information. These profiles can be kept confidential and updated to include any other type of profile information.

[052] Fig. 4a is a block diagram of a service center, in accordance with methods and apparatus consistent with the principles of the present invention. As shown, service center 106 includes firewalls 400 and 402, a data interface server 404, a management server 406, a voice interface server 408, a calendar server 410, and unified communications server 460.

[053] Firewalls 400 and 402 provide security services for communications between service center 106 and data network 102, and between service center 106 and voice network 104, respectively. For example, firewalls 400 and 402 may restrict communications between user terminal 112 and one or more servers within service center 106. Any security policy may be implemented in firewalls 400 and 402 consistent with the principles of the present invention. Firewalls 400 and 402 may be implemented using a combination of known hardware and software, such as the Raptor Firewall provided by the Axent Corporation. Furthermore, firewalls 400 and 402 may be implemented as separate machines within service center 106, or implemented on one or more machines external to service center 106.

[054] Data interface server 404 provides interface services between service center 106 and user terminal 112. For example, data interface server 404 may exchange TCP/IP communications, such as IM communications or XML information which include call forwarding patterns from user 110. Data interface server 404 may also interface proxy 124 to indirectly exchange communications with user terminal 112.

[055] Management server 406 controls operation of service center 106 and provides access services to service center database 108. For example, management server 406 may store information, such as call forwarding patterns, received from data interface server 404 into service center database 108. Management server 406 may also service queries to service center database 108, for example, from data interface server 404 or voice interface server 408.

[056] Voice interface server 408 provides interface services between service center 106 and voice network 104. For example, voice interface server 408 may

exchange information, such as call forwarding patterns, between service center database 108 and voice network 104. Voice interface server 408 may provide the information to voice network 104 using one or more protocols. For example, voice interface server 408 may use TCP/IP, or the Signaling System 7 ("SS7") protocol.

[057] SS7 is a telecommunications protocol defined by the International Telecommunication Union ("ITU"). SS7 is an "out-of-band" signaling protocol using a system of nodes called Service Switching Points ("SSP"), Signal Transfer Points ("STP"), and Service Control Points ("SCP"). "Out-of-band signaling" is signaling that does not take place over the same path between switching elements as the connection, and instead uses separate digital channels between SS7 nodes. SS7 allows voice network 104 to provide enhanced functions, such as call forwarding; caller-ID; three-way calling; wireless services such as roaming and mobile subscriber authentication; local number portability; and toll-free/toll services.

[058] Calendar server 410 provides services to calendar application 220 on user terminal 112. For example, calendar server 410 may provide email services, directory services, and calendar information, such as schedule information, to user terminal 112. Calendar server 410 may operate in conjunction with data interface server 404 to exchange, for example, call forwarding patterns with user terminal 112.

[059] Although Fig. 4a shows separate servers within service center 106, service center 106 may be implemented using any combination of hardware and software. For example, service center 106 may implement data interface server 404, management server 406, voice interface server 408, calendar server 410 and unified communication server 460 as software applications installed on a single machine. In

addition, service center 106 may access one or more servers remotely across a network.

[060] Fig. 4b is a detailed block diagram of the unified communications server 460, in accordance with methods and apparatus consistent with the principles of the present invention. As shown, unified communication server 460 includes a set of functional servers. The functional servers are a security server 462, a call control server 464, a conferencing server 466, a speech processing server 468, a remote computing server 470, a back office server 472, a LDAP directory server 474, a messaging server 476, calendar/contact management server 478 and profile and personalization management server 480.

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[061] Security server 462 can provide security checks on incoming calls, such as checking if the caller is wanted or unwanted. Call control server 464 can control calls, performing actions such as call forwarding based on user set preferences. Conferencing server 466 can create conference calls by using a calendar based system to notify a user 110 of a conference call and then making the call connections. Speech processing server 468 can perform speech processing, allowing a user to verbally communicated with the unified communication manager. Remote computing server 470 can manage and perform remote computing services. Back office server 472 can perform back office functions such as controlling billing and managing user profiles. LDAP directory server 474 can perform directory lookups by interfacing with SCP 600 can controlling the look up of Caller-ID information in configuration database 614. Messaging server 476 can be an IM messaging server to control the sending of IM messages to the user terminal 112 of user 110. Calendar/contact management server

478 can be a set of calendaring software that manages all the calendared entries of the user 100. Profile and personalization management server 480 can perform the management and control of service center database 108 and initialing and updating user profile information.

[062] Although Fig. 4b shows separate servers within unified communication server 460, unified communication server 460 may be implemented using any combination of hardware and software. For example, unified communication server 460 may implement a security server 462, a call control server 464, a conferencing server 466, a speech processing server 468, a remote computing server 470, a back office server 472, a LDAP directory server 474, a messaging server 476, calendar/contact management server 478 and profile and personalization management server 480 as software applications installed on a single machine. In addition, unified communication server 460 may access one or more servers remotely across a network.

[063] Fig. 5a is an exemplary record table illustrating configuration information for a user, in accordance with methods and apparatus consistent with the principles of the present invention. As shown, record table 500 includes a device name column 502 and an address column 504. Record table 500 is stored at user terminal 112, such as in storage module 204, and service center database 108.

[064] Device name column 502 includes information for identifying a particular device, such as phones 114, 116, and 118, or an email address, a pager number, or a voice mail box associated with user 110. User 110 may select any combination of text and numerals to identify a particular device. For example, user 110 may identify phone 114 as "Home," phone 116 as "Office," and phone 118 as "Mobile." In addition, device

name column 502 may include information selected by service center 106. For example, management server 406 may provide a proposed “default” name for a particular device.

[065] Fig. 5b is an exemplary record table 506 illustrating rules and associated calendar data for forwarding communications, in accordance with methods and apparatus consistent with the principles of the present invention. As shown, record table 506 includes a pattern name column 508, a start date column 510, a start time column 512, an end data column 514, an end time column 516, a source identifier column 518, a destination identifier column 520, and a forwarding destination column 522. Table 506 is stored at user terminal 112, such as in storage module 204, and in service center database 108.

[066] Pattern name column 508 includes information for identifying a particular forwarding pattern. User 110 may select any combination of text or numerals to identify a particular forwarding pattern. For example, user 110 may use “At Work” to identify a particular forwarding pattern for use during working hours, such as 9:00 AM to 5:00 PM. In addition, pattern name column 508 may include information selected by service center 106. For example, management server 406 may provide a default name for a particular forwarding pattern, such as “placeholder.”

[067] Start date column 510 and start time column 512 includes information indicating a start date and time for when a particular forwarding pattern is in effect. End date column 514 and end time column 516 includes information indicating an end date and time for when the particular forwarding pattern expires.

[068] Source identifier column 518 includes information identifying a source of a communication, such as a telephone call. For example, source identifier column 518 may include the phone number for phone 122. Alternatively, source identifier column 518 may include information identifying calling party 120.

[069] Destination identifier column 520 includes information identifying a destination of a communication, such as a telephone call. For example, destination identifier column 520 may include respective phone numbers for phones 114, 116, and 118.

[070] Forwarding destination column 522 includes information identifying where a communication, such as a telephone call, is forwarded. For example, forwarding destination column 522 may indicate the phone number for phone 118 as a forwarding destination.

[071] Fig. 6 is a block diagram of a voice network, in accordance with methods and apparatus consistent with the principles of the present invention. As shown, voice network 104 includes a service control point ("SCP") 600, service transfer points ("STP") 602 and 604, service switching points ("SSP") 606, 608, 610, and 612, and a configuration database 614.

[072] Voice network 104 may be implemented using the PSTN and SS7 as a signaling protocol. As noted above, the SS7 protocols allows voice network 104 to provide features, such as call forwarding; caller-ID; three-way calling; wireless services such as roaming and mobile subscriber authentication; local number portability; and toll-free/toll services. The SS7 protocol provides various types of messages to support the features of voice network 104. For example, these SS7 messages may include

Transaction Capabilities Applications Part ("TCAP") messages to support event "triggers," and queries and responses between SCP 600 and SSPs 606, 608, 610, and 612.

[073] SCP 600 provides interface services into configuration database 614 related to processing of calls within voice network 104, and interface services between voice interface server 408. SCP 600 provides translation and routing services of SS7 messages to support the features of voice network 104, such as call forwarding. In addition, SCP 600 may exchange information voice interface server 408 in service center 106 using TCP/IP or SS7. For example, SCP 600 may receive configuration information from voice interface terminal 408 which requests one or more call forwarding patterns in voice network 104. SCP 600 may then configure the call forwarding patterns in voice network 104 using one or more SS7 messages, such as TCAP messages, to set triggers in SSPs 606, 608, 610, and 612.

[074] SCP 600 may be implemented using a combination of known hardware and software. Although SCP 600 is shown with a direct connection to service center 106, any number of network elements including routers, switches, hubs, etc. may be used to connect SCP 600 and service center 106.

[075] STPs 602 and 604 relay SS7 messages within voice network 104. For example, STP 602 may route SS7 messages between SSPs 606, 608, 610, and 612. STP 602 and 604 may be integrated as adjunct to an SSP, e.g., SSPs 606, 608, 610, and 612, or may be implemented as a separate machine. In addition, STP 602 and 604 may provide security functions, such as security checks on incoming/outgoing SS7 messages. STP 602 may also provide other functions, such as acquisition and storage



of traffic/usage statistics. STP 602 may be implemented using known hardware and software from manufacturers such as NORTEL™ and LUCENT Technologies™.

[076] SSPs 606, 608, 610, and 612 provide an interface between voice network 104 and phones 114, 116, 118, and 122, respectively, to setup, manage, and release telephone calls within voice network 104. SSPs 606, 608, 610, and 612 may be implemented as a voice switch, an SS7 switch, or a computer connected to a switch. SSPs 606, 608, 610, and 612 exchange SS7 signal units to support a telephone call between calling party 120 and user 110. For example, SSPs 606, 608, 610, and 612 may exchange SS7 messages, such as TCAP messages, within message signal units ("MSU") to control calls, perform database queries to configuration database 614, and provide maintenance information.

[077] Configuration database 614 comprises one or more known databases to support the features of voice network 104. For example, configuration database 614 may include a call management service database; a line information database (LIDB); a business services database; a home location register; and a visitor location register.

[078] Fig. 7 is a flow diagram illustrating a method of providing unified communication management via instant messaging, in accordance with methods and apparatus consistent with the principles of the present invention. The unified communications manager, i.e., unified communication server 460, receives a request for service from a user 110 in the form of an IM message (step 705). For example, user 110 may initiate an application, e.g., an installed IM client, on user terminal 112. In another example, user 110 may initiate the connection through phone 114 and via voice network 104.

[079] The unified communications manager directs the request to the appropriate functional server (step 710). Examples of requests and functional server pairings include response to a request for call forwarding by call control server 464; responding to a request for a conference call by the conferencing server 466; responding to a request for a name lookup by LDAP directory server 474. One skilled in the art would also appreciate that the services performed may be performed by any number of servers for any number of types of requests.

[080] The appropriate functional server performs the request (step 715). An example of performing a request include a functional server modifying a record in service center database 108 associated with user 110. Additionally, a functional server may request to SCP 600 to verify a voice mail notification service for user 110 at the phone number for phone 114. In another example, in response to the request, a functional server may verify Caller-ID service for user 110 at the phone number for phone 114. As yet another example, in response to the request, a functional server may send a request to SCP 600 to create a call forwarding service for user 110. Hence, whenever a call is attempted to phone 114, SCP 600 may cause the call to be forwarded, e.g., to another phone as specified by service center database 108. One skilled in the art would also appreciate that the services performed may be repeated for any number of devices or types of requests associated with user 110, including a wireless phone, a work phone number, etc.

[081] The unified communications manager sends an IM message to user 110, updating them on the status of their request (step 720). The IM message may be sent to user terminal 112 via unified communications server 460 over data network 102.

[082] Other embodiments of the invention will be apparent to those skilled in the art from consideration of the specification and practice of the invention disclosed herein. It is intended that the specification and examples be considered as exemplary only, with a true scope and spirit of the invention being indicated by the following claims.